

Research Report 1416

AD-A174 842

Modeling the Enlistment Process for Personnel Planning

Edward J. Schmitz and Abraham Nelson

Personnel Utilization Technical Area
Manpower and Personnel Research Laboratory

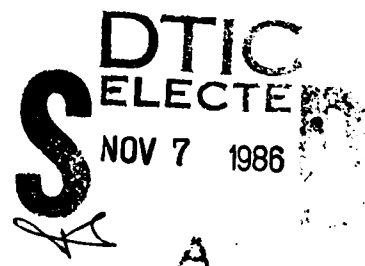


U. S. Army

Research Institute for the Behavioral and Social Sciences

June 1984

Approved for public release; distribution unlimited.



DTIC FILE COPY

86 11 7 015

U. S. ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES

A Field Operating Agency under the Jurisdiction of the
Deputy Chief of Staff for Personnel

EDGAR M. JOHNSON
Technical Director

L. NEALE COSBY
Colonel, IN
Commander

Technical review by

Lawrence M. Hanser
Daniel R. Tufano

NOTICES

DISTRIBUTION: Primary distribution of this report has been made by ARI. Please address correspondence concerning distribution of reports to: U.S. Army Research Institute for the Behavioral and Social Sciences, ATTN: PERI-TST, 5001 Eisenhower Avenue, Alexandria, Virginia 22333.

FINAL DISPOSITION: This report may be destroyed when it is no longer needed. Please do not return it to the U.S. Army Research Institute for the Behavioral and Social Sciences.

NOTE: The findings in this report are not to be construed as an official Department of the Army position, unless so designated by other authorized documents.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM	
1. REPORT NUMBER ARI Research Report 1416	2. GOVT ACCESSION NO. <i>RD-A114</i>	3. RECIPIENT'S CATALOG NUMBER <i>872</i>	
4. TITLE (and Subtitle) MODELING THE ENLISTMENT PROCESS FOR PERSONNEL PLANNING		5. TYPE OF REPORT & PERIOD COVERED Period ending September 1983	
		6. PERFORMING ORG. REPORT NUMBER ---	
7. AUTHOR(s) Edward J. Schmitz Abraham Nelson		8. CONTRACT OR GRANT NUMBER(s) ---	
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Army Research Institute for the Behavioral and Social Sciences 5001 Eisenhower Avenue, Alexandria, VA 22333-5600		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 2Q162722A791	
11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Army Research Institute for the Behavioral and Social Sciences 5001 Eisenhower Avenue, Alexandria, VA 22333-5600		12. REPORT DATE June 1984	
		13. NUMBER OF PAGES 35	
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) ---		15. SECURITY CLASS. (of this report) Unclassified	
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE ---	
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited			
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) ---			
18. SUPPLEMENTARY NOTES ---			
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Enlistment decision making, Recruiting, Enlistment processing, <i>Subs.</i>			
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Each year the Army expends resources processing a large number of applicants in order to recruit the desired number of enlistments. This paper examines the processing of applicants from the Military Enlistment Processing Site through to accession. The differential behavior of various categories of applicants was analyzed over FY 81 and FY 82 to identify patterns, trends, and areas where processing improvements may be possible.			

DD FORM 1 JAN 73 1473

EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

1 SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Modeling the Enlistment Process for Personnel Planning

Edward J. Schmitz and Abraham Nelson

Personnel Utilization Technical Area
Paul A. Gade, Chief

Manpower and Personnel Research Laboratory
Joyce L. Shields, Director

Accession For	
NTIS GRA&I	<input checked="checked" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution/	
Availability Codes	
Avail and/or	
Dist	Special
Al	

U.S. ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES
5001 Eisenhower Avenue, Alexandria, Virginia 22333-5600

Office, Deputy Chief of Staff for Personnel
Department of the Army

June 1984



Army Project Number
2Q162722A791

Manpower, Personnel, and Training

Approved for public release; distribution unlimited.

ARI Research Reports and Technical Reports are intended for sponsors of R&D tasks and for other research and military agencies. Any findings ready for implementation at the time of publication are presented in the last part of the Brief. Upon completion of a major phase of the task, formal recommendations for official action normally are conveyed to appropriate military agencies by briefing or Disposition Form.

FOREWORD

The U.S. Army is the nation's largest recruiter of manpower. Each year the U.S. Army Recruiting Command expends hundreds of millions of dollars and contacts many hundreds of thousands of individuals in order to enlist the high-quality soldiers it needs.

This report analyzes what happened to the hundreds of thousands who applied to the Army in recent years. The report provides information to Army recruiting and manpower planning personnel on how well the process is currently working, how it has changed over time, and how and where it is possible to improve the effectiveness and efficiency of recruiting.



EDGAR M. JOHNSON
Technical Director

MODELING THE ENLISTMENT PROCESS FOR PERSONNEL PLANNING

EXECUTIVE SUMMARY

Requirement:

To understand the processing of individuals for enlistment to the Army, quantitatively, qualitatively, and over time, and determine where new recruiting procedures could produce payoffs.

Procedure:

A model of the major enlistment processing decision points was developed. Data from FY81 and FY82 were analyzed to determine the processing flows and time intervals between various decision points. Analyses were done by AFQT category, education, sex, race, and prior service/non-prior service to identify the behavior of different applicants.

Findings:

Approximately three applicants were processed for every one accession during FY81/82. The time between application and contract was generally one week or less, while the time between contract and accession was usually two or more months. Contracting probabilities for eligible individuals were highest for non-white, non-high school, non-prior service males in mental category IIIB, and lowest for white high school graduate, non-prior service males in mental categories I and II. Contracting rates for groups in demand by the Army increased from FY81 to FY82, but more so for non-whites.

Utilization of Findings:

The findings from this paper make it possible to project the number of enlistments from the flow of applicants. The information on processing times and enlistment probabilities helps analysts design and evaluate systems dealing with recruiting, selection, and allocation programs.

MODELING THE ENLISTMENT PROCESS FOR PERSONNEL PLANNING

CONTENTS

	Page
I. INTRODUCTION	1
II. THE RECRUITING ENVIRONMENT	1
III. A MODEL OF ENLISTMENT PROCESSING	3
IV. RESULTS FOR FY81 AND FY82 ENLISTMENT COHORTS	7
V. CONCLUDING REMARKS	14
REFERENCES	21
APPENDIX A	A-1
APPENDIX B	B-1

LIST OF TABLES

Table 1. Time Between Application and Contract	10
2. Percent of FY81 Male Non-Prior Service Applicants Who Take Physical	11
3. Percent of FY81 Male Non-Prior Service Applicants Who Fail Physical	12
4. Percent of FY81 Fully Qualified Non-Prior Service Male Applicants Who Sign Contract	13
5. Percent of FY81 Non-Prior Service Male Applicants Who Signed Contracts	15
6. Percent of FY81 Delayed Entry Program Loss Rates For Male Non-Prior Service Contract	16
7. Comparison of Contracting Probabilities FY81 and FY82	18

LIST OF FIGURES

Figure 1. Army Personnel Accession Flow (FY81)	5
2. Male American Youth Vs. FY81 Army Applicants By Mental Category	8
3. Time Between Application and Contract	9
4. Army Personnel Accession Flow (FY82)	17

I. INTRODUCTION

The processing of new enlistees into the Army is a key step in personnel planning. The Army hires at the entry level and relies upon promotion and retention to fill career positions. Hence, the numbers and kinds of people enlisted today not only will affect current soldier performance, but largely influence the future of the Army's enlisted leadership and technical expertise.

This research investigates the process of moving from an applicant to an accession. This process is related to a number of significant personnel activities, including recruiting, classification, and job allocation. It also provides useful information on forecasting the supply of Army applicants for job assignment and monitoring the impact of factors on recruiting.

Some of the specific research results in this report include:

- o Development of a model of enlistment processing from applicant through accession.
- o Identification of what kinds of people continue processing through to signing a contract and enlisting.
- o Depiction of the kinds of people who do not complete processing, and and at what stages they are lost.
- o Estimation of how long steps in the process take and what impact this has on allocation policies.
- o Projection of potential benefits might be possible with more effective recruiting systems.
- o Examination of how enlisted processing changed over FY81-82.

The remainder of this report describes results from an empirical model of the enlistment process. The second section provides background on the recruiting environment and related issues. Section III develops a model of enlistment processing. The fourth section describes the results found for FY81 and FY82. The final section discusses the results, including uses of the information and further research issues.

II. THE RECRUITING ENVIRONMENT

The recruiting process is interrelated to many occurrences within the Army and in society in general. This section describes some of the important aspects of recruiting, including selection standards, recent trends, and selected systems improvements.

Recruiting is a major activity for the Army. Currently, the US Army Recruiting Command (USAREC) operates a force of about five thousand recruiters and expends \$580 millions annually to recruit the active force (US Army Audit Agency, 1982). These resources are devoted to recruiting approximately 140,000 Army accessions each year.

USAREC and the Army are concerned about the quality of recruits and the efficiency of achieving the Army's mission. Since the Army acquires virtually all enlisted personnel at the unskilled entry level, the effectiveness of initial recruiting will affect the quality of the force for years to come. The only way the Army can obtain the experienced helicopter mechanics and infantry sergeants for the future is to recruit and begin training them today.

Selection Standards

The selection of individuals is done primarily through the meeting of minimum standards. All soldiers must meet certain physical, moral, and mental standards to be candidates for the Army. Enlistments are often categorized by such factors as mental ability, education, prior service, gender, and race when one examines the composition of new recruits.

The Armed Services Vocational Aptitude Battery (ASVAB) is used to determine whether an individual is mentally qualified for enlistment and for which specific military occupational specialties (MOS) they are qualified for.

A section of the ASVAB, the Armed Force Qualifying Test (AFQT), determines whether an individual is qualified for the service. The AFQT tests verbal ability, mathematics, and reading. It is generally considered a good indicator of overall training ability. Nine separate aptitude area composite scores are computed from the ASVAB to qualify for specific categories of jobs. However, these aptitude area composites tend to be highly correlated with AFQT.

Five categories are defined from the AFQT, ranging from I through V. Category I includes individuals who score in the upper 9 percent of the population whereas category V includes the lowest 9 percent. Various limits and goals are set on the quality of enlistees by Congress, the Department of Defense, and the Army. For example, individuals in category V are excluded from the military, and Congressional limits are set on the number of category IVs permitted to enlist. Also quality goals are set by the Army on the numbers to be recruited from the upper half of the AFQT distribution (categories I-III A).

Hence, AFQT category is a key enlistment decision variable. Individuals in the lower categories are likely to be ineligible for service or limited in the numbers and kinds of MOS they qualify for. Upper AFQT candidates have more options available to them and may have lower propensities to enlist.

Whether someone has been in the service before is important because they have to satisfy higher enlistment standards than NPS personnel. Also, prior service enlistees go through different training.

Enlistment standards differ by gender. Females have to meet higher educational and AFQT standards than males. Women are also restricted from many MOS since they cannot be involved in combat.

Education is a major enlistment qualifier. Education has been shown to be a good predictor of first term attrition (Manganaris, 1984). HSDGs are preferred to nongraduates, since they have much higher retention rates. However, HSDGs also may have more career alternatives to consider.

Race is an important categorical descriptor for analyzing the enlistment decision. Recent models of the enlistment decision have shown that non-white

enlistment rates are less sensitive to unemployment (Dale and Gilroy, 1983), and that they are less likely to enlist than whites (Daula and Fagan, 1982).

Recruiting Trends

The Army makes hundreds of thousands of selection and classification decisions while attempting to satisfy multiple personnel policy goals and deal with changing personnel pools and environments. For example, the quality of accessions has increased dramatically during the last few years. In FY 80 only 26 percent of the non-prior service (NPS) accessions were in the upper half of the population with respect to AFQT score. In FY83 61 percent were in categories I-III A. The percent of high school diploma graduates also increased from 54 percent to 88 percent. (See Appendix A for detailed results).

The recruiting environment has dramatically changed the issues faced by the Army personnel community. Within the space of three years, the Army goals moved from quantity to quality to excellence. Previously the dominant need had been simply to fill vacancies. First, the Army needed to satisfy quantity and obtain sufficient numbers of people in order to meet manpower requirements. Minimum standards with respect to education and aptitude had been significant constraints in the past. In 1980 the Army was able to achieve its quantity goal. Since 1980, as the economy, society, and other factors changed, the Army achieved large improvements in the quality of accessions, as measured by AFQT category and education.

However, the recent improvements in recruiting do not guarantee continued success in the future. As the economy undergoes a recovery there will be additional competition for high quality applicants (Dale and Gilroy, 1983). There will be increasing pressure to recruit more efficiently.

One way to increase recruiting efficiency is to recruit a higher proportion of those individuals who demonstrate a propensity to enlist. Two major research efforts could increase the quality propensity:

- o Joint Optical Information Network (JOIN)
- o Enlisted Personnel Allocation System (EPAS).

JOIN provides applicants with detailed visual information on opportunities with the Army (Tarbutton, 1983). EPAS will work within the REQUEST system to identify military occupational specialties that will provide the best match between the applicant's abilities and interests and the Army's requirements (Schmitz, 1984).

III. A MODEL OF ENLISTMENT PROCESSING

The approach was to identify the important enlistment processing stages and categories of personnel, and compute the flows, probabilities, and times for different categories of people to complete steps in the process.

The Army recruits personnel across the entire United States (including Puerto Rico). Recruiters, based in 2,200 recruiting stations, identify applicants and "sell" them on the Army. Serious candidates then usually take

the ASVAB. Individuals who qualify on the ASVAB proceed to one of the 68 Military Enlistment Processing Sites (MEPS), where they take a physical, meet with an Army guidance counselor, sign a contract for a specific training assignment, and either enter the Army directly, or go into the delayed entry program (DEP) until they enter on active duty at a later date.

The six documented steps in enlistment processing are:

1. Take the ASVAB (formally applying)
2. Pass the ASVAB
3. Take the physical
4. Pass the physical
5. Sign a contract
6. Enter the Delayed Entry Program (DEP)/direct enlistment
7. Access from the DEP/DEP loss

Figure 1 illustrates the relationship of the various steps in flowchart form. The individual enters the automated recordkeeping system of the Military Enlistment Processing Command (MEPCOM) when he takes the ASVAB and formally applies to the Army. Not everyone who expresses an interest in the Army proceeds to take the ASVAB. Some selection occurs prior to formally applying. Recruiters search for individuals based upon the need to fill various mission boxes (Allen and Schmitz, 1983). Individuals unlikely to qualify on the ASVAB are eliminated by an enlistment screening test. Non-high school graduates, who are likely candidates for attrition, must score an acceptable level on a test designed to predict attrition (Eaton, 1982).

The next step in a typical enlistment processing is taking the physical. Two groups of individuals do not take the physical: those who fail the AFQT qualifications and those who choose not to pursue enlistment further. Minimum AFQT scores to enlist are 15 for high school diploma graduates or high school seniors and 31 for non-high school graduates. At this point a person will be qualified to enlist in the Army. (However, some individuals take the physical prior to the ASVAB and are later declared mentally unqualified.)

Many qualified individuals decide not to enlist. A recent study of the FY77 enlistment process found 22.4 percent of Army applicants who qualified on the ASVAB failed to enlist (Berryman, 1983).

The signing of an enlistment contract occurs after passing these standards. A qualified individual enlists for a specific MOS, training date, training location, and unit. While some contracts enlist directly, most enter the DEP. The DEP permits a contract to wait up to one year to enter the Army. Thus, considerable flexibility in scheduling training exists for both the individual

ARMY PERSONNEL ACCESSION FLOW (FY 81)

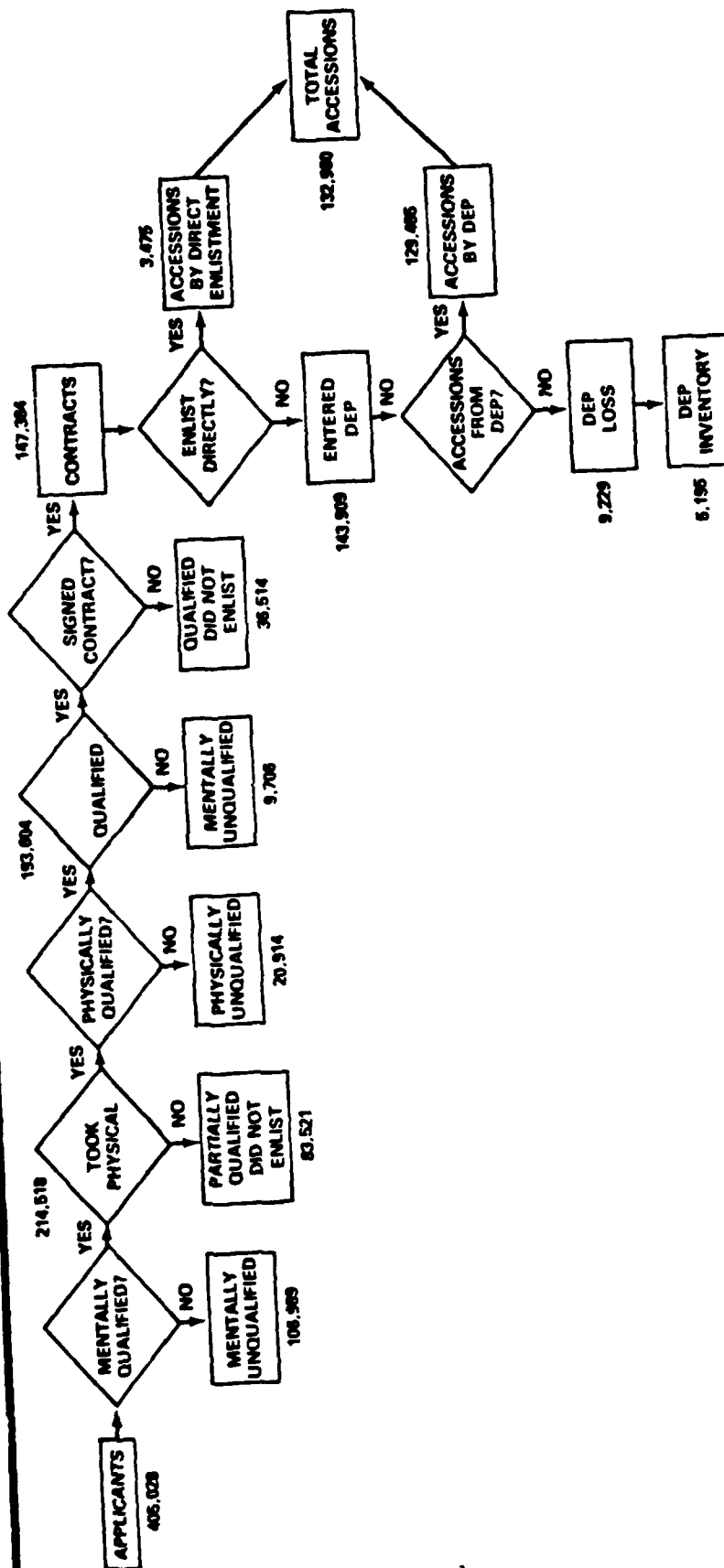


Figure 1

and the Army. Finally, an individual either becomes an accession or a DEP loss after entering the DEP.

Figure 1 also provides the aggregate flow observed for FY81. Over 405 thousand individuals applied to the Army, resulting in 133 thousand accessions. Thus, about three applicants were required for every one accession.

However, gross counts are not necessarily the most meaningful processing statistic. Different types of people go through the enlistment process with different probabilities of completion. The classifications of greatest interest for enlistment processing are:

1. Prior Service/Non-Prior Service (NPS)
2. Male/Female
3. High School Degree Graduate (HSDG)/Non-High School
4. AFQT Category (I and II, IIIA, IIIB, IV, V)
5. White/Non-White

The enlistment variables produce 80 personnel categories -- 2 (prior service) x 2 (sex) x 2 (education) x 5 (AFQT category) x 2 (race). However, the detailed analysis of groups was limited to non-prior service males, since this group is the largest and the one most in demand by the Army. Since AFQT category IV nongraduates and all category Vs are not eligible to enlist, this leaves 14 categories of personnel for detailed analysis.

Transaction counts from the applicant data files were analyzed. The data base consisted of cohorts of records for FY81 and FY82. MEPCOM edit tapes for each month of the fiscal year were merged and edited so that only the most recent transaction remained for each individual.

The transaction counts amount to annual snapshots of enlistment processing activity. The count of the numbers of each transaction type by personnel category provides an estimate of the frequency of each event occurring.

The annual transaction rate method could have some problems with bias. The actions of an individual are tracked only over one year. For example, if there were an uneven flow of people into the processing system over the year the transaction rate estimates could be incorrect. The cohort follow-up method used by Berryman would avoid this problem. However, if the time between events is small, such as the time between application and contract, then any error should be small. Furthermore, the cohort tracking performed creates additional difficulties in matching records produced at different times and by different systems, which could create other biases (Berryman, p. 102-104).

In addition to examining the transition probabilities, the time between processing points was analyzed. The time from applicant to contract and from contract to accession were analyzed through a reverse cohort analysis. That is, all those individuals who accessed at the same time were analyzed to determine when they signed their contract.

IV. RESULTS FOR FY81 AND FY82 ENLISTMENT COHORTS

The processing of NPS males was analyzed in detail. Figure 2 compares Army applicants to the male American youth population (Profile of American Youth, 1982). FY81 applicants scored considerably lower. Only 18 percent of Army applicants were in AFQT category I and II, compared to 40 percent for the Youth cohort. Over half (54 percent) of the applicants were in category IV or V, compared to 31 percent for the youth cohort.

The time between application and contract is important for the development of EPAS. Since EPAS will provide information to the guidance counselor on the desired MOS-applicant match, it is useful to know how much time is typically available to process job recommendations. For example, efficient batch assignment procedures could be possible if sufficient time exists between taking the ASVAB and contract signing (See Hatch, 1971, for an example of similar applications). Such procedures would not be possible if these actions occurred simultaneously.

The application to contracting time was usually very short, with most individuals signing a contract either the same month they applied or the next month. However, because of the DEP, time between contracting and accession is much longer. Only 14 percent accessed the same month they contracted, and over half the accessions had contracted at least three months earlier.

The time between application and contract was relatively steady over FY81. Figure 3 shows the percent of contracts that had applied the same month, the previous month, and the total of those two months. While there was some seasonal variation in the patterns, such as in January, the total appeared relatively stable over the course of the year.

Table 1 shows the distribution of time between original application and contract for NPS contracts during FY81. Fourteen percent of the actions occurred the same day. The median time was seven days.

The probabilities of completing various stages between application and contract were analyzed for FY81. (Since the analysis found the median time between these two events to be only seven days, any biases produced by an annual rate computation should be slight.) Table 2 shows the probabilities of taking the physical for NPS males. Results are broken out by education, AFQT category, and race. Nongraduates always had higher probabilities of taking the physical than high school graduates, and non-whites always had higher probabilities than whites. As AFQT category goes from I & II to IIIB the probabilities increase. However, probabilities decline for category IV. Overall, probabilities ranged from 72 percent for a white category I and II high school graduate to 91.1 percent for a non-white category IIIB nongraduate.

Table 3 shows the probabilities of failing the physical. As one might expect, the percentages exhibit little variability. However, non-white non-graduate IIIBs again have the lowest probability of failing (6.5 percent).

Table 4 shows the probabilities of signing contracts for fully qualified applicants. There are similar rates for all groups. Only category I & II high school graduates have a somewhat lower contracting rate.

MALE AMERICAN YOUTH VS. FY 81 ARMY APPLICANTS BY MENTAL CATEGORY

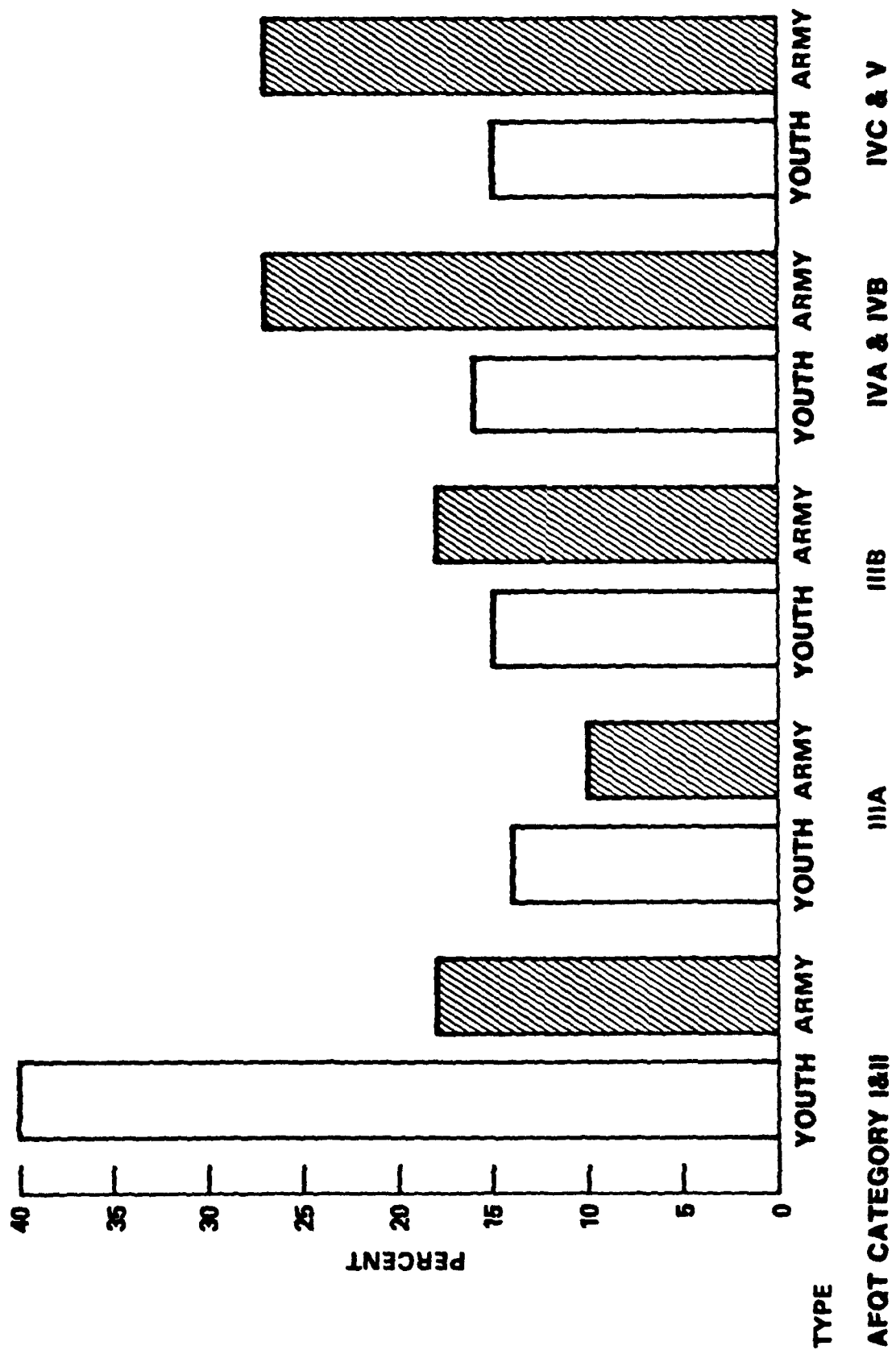


Figure 2

TIME BETWEEN APPLICATION AND CONTRACT (FY 81)

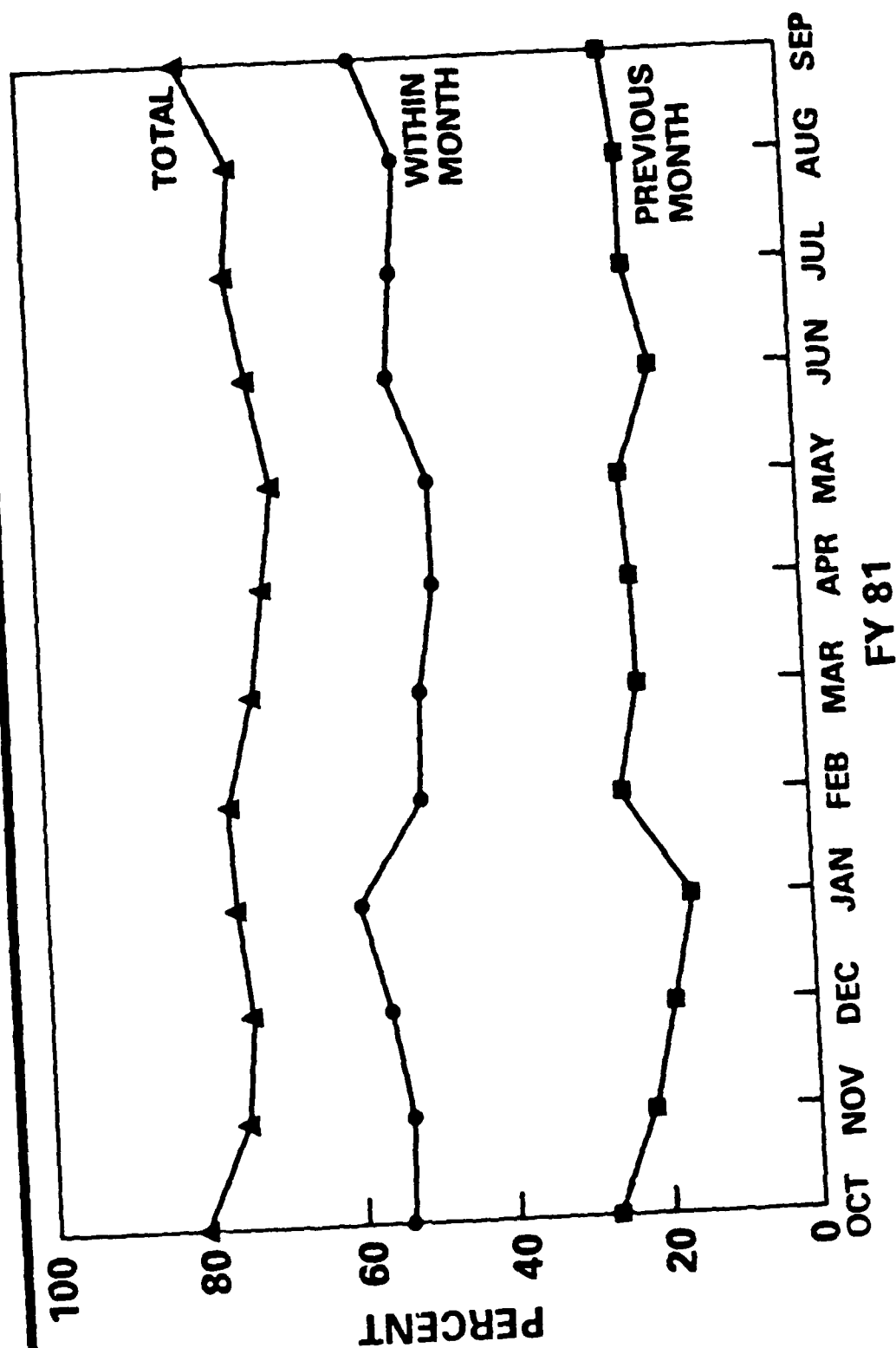


Figure 3

Table 1
Time Between Application and Contract

<u>Number of Days Between Application and Contract</u>	<u>Number</u>	<u>Percent</u>	<u>Cumulative Percent</u>
None	14,599	13.7	13.7
1	7,974	7.5	21.2
2	7,642	7.2	28.4
3	5,611	5.3	33.7
4	4,835	4.5	38.2
5	4,656	4.4	42.6
6	5,341	5.0	47.6
7	5,283	5.0	52.6
8	3,838	3.6	56.2
9 - 30	21,377	20.0	76.2
31 - 365	25,447	23.8	100.0
366 or more	42	< .1	100.0
Total	106,645	100.0	100.0

Table 2

Percent of FY81 Male Non-Prior Service
Applicants Who Take Physical

<u>Mental Category</u>	<u>Race</u>	<u>High School Graduates</u>	<u>Non-High School Graduates</u>
I & II	White	72.0	75.9
	Non-White	74.6	77.0
IIIA	White	75.0	80.4
	Non-White	79.4	82.8
IIIB	White	75.6	86.9
	Non-White	83.2	91.1
IV	White	74.2	-
	Non-White	78.5	-

Table 3

Percent of FY81 Male Non-Prior Service
Applicants Who Fail Physical

<u>Mental Category</u>	<u>Race</u>	<u>High School Graduates</u>	<u>Non-High School Graduates</u>
I & II	White	8.8	8.4
	Non-White	8.6	8.2
IIIA	White	8.9	9.1
	Non-White	8.0	8.2
IIIB	White	9.7	7.9
	Non-White	8.2	6.5
IV	White	9.3	-
	Non-White	7.3	-

Table 4

Percent of FY81 Fully Qualified Non-Prior Service
Male Applicants Who Sign Contract

<u>Mental Category</u>	<u>Race</u>	<u>High School Graduates</u>	<u>Non-High School Graduates</u>
I & II	White	78.6	82.4
	Non-White	79.2	83.4
IIIA	White	84.9	85.5
	Non-White	83.6	86.1
IIIB	White	84.9	87.3
	Non-White	86.2	86.8
IV	White	83.4	-
	Non-White	82.1	-

Table 5 shows the probabilities of signing a contract for different categories of applicants. Considerable variability existed among the different groups. Non-white IIIB non-graduates had a 43 percent greater probability of signing a contract than white category I & II high school graduates.

DEP losses were also examined. It is important to know if different groups have different likelihoods of becoming DEP losses, since the Army is interested in accessions, not just signing contracts. DEP loss rates were examined for selected categories of individuals. For example, NPS Women had DEP loss rates three times greater than other groups. Table 6 shows the DEP loss rates for NPS males. Little variation existed, although non-whites tended to have lower loss rates than whites, and non-graduates usually had lower DEP loss rates than graduates.

Figure 4 illustrates the aggregate results for FY82. Somewhat suprisingly, there were fewer total applicants than in FY81 to produce the same number of accessions. This was because the quality of applicants increased. Only 38 percent of applicants were AFQT Category IV or V, compared to 54 percent in FY81. Appendix B provides information on the conditional probabilities of taking a physical, passing a physical, and signing a contract in that year.

Table 7 compares the probabilities of applicants becoming contracts for FY81 and FY82. Except for groups where standards were tightened (NHS category IIIB and high school category IV), enlistment probabilities increased more for non-whites than for whites. The non-white probabilities increased 3.5 percent to 4.9 percent more than the comparable white category between FY81 and FY82.

V. CONCLUDING REMARKS

The principal findings of the research on enlistment processing were:

- Substantial numbers of qualified individuals were being lost in the enlistment process between formal application and contract.
- The time between application and contract is very short with a median time of seven days, with 14 percent of the actions processed the same day.
- Groups differed substantially in their contract probabilities by education, AFQT category, and race.
- Total applicants declined between FY81 and FY82.
- Contract probabilities have increased more for non-whites than whites, controlling for other factors.

Many high quality people who apply to the Army chose not to enlist. Only 56 percent of white male HSDGs who applied actually signed contracts. Furthermore, the higher the quality, the greater the percent lost. This is understandable, because bright, educated people would have more opportunities for employment and education outside the Army. However, it is expected that enlistment bonuses, the Army College Fund, two year enlistments, and other options would help counteract the loss of such applicants.

Table 5

Percent of FY81 Non-Prior Service Male
Applicants Who Signed Contracts

<u>Mental Category</u>	<u>Race</u>	<u>High School Graduates</u>	<u>Non-High School Graduates</u>
I & II	White	51.7	57.3
	Non-White	54.0	59.0
IIIA	White	58.0	62.5
	Non-White	61.0	65.4
IIIB	White	57.9	69.8
	Non-White	65.9	74.0
IV	White	56.2	-
	Non-White	59.8	-

Table 6

Percent of FY81 Delayed Entry Program Loss Rates
For Male Non-Prior Service Contract

<u>Mental Category</u>	<u>Race</u>	<u>High School Graduates</u>	<u>Non-High School Graduates</u>
I & II	White	4.5	5.1
	Non-White	4.3	3.3
IIIA	White	5.0	4.0
	Non-White	4.5	4.1
IIIB	White	5.4	3.1
	Non-White	3.7	2.5
IV	White	6.1	-
	Non-White	4.4	-

ARMY PERSONNEL ACCESSION FLOW (FY 82)

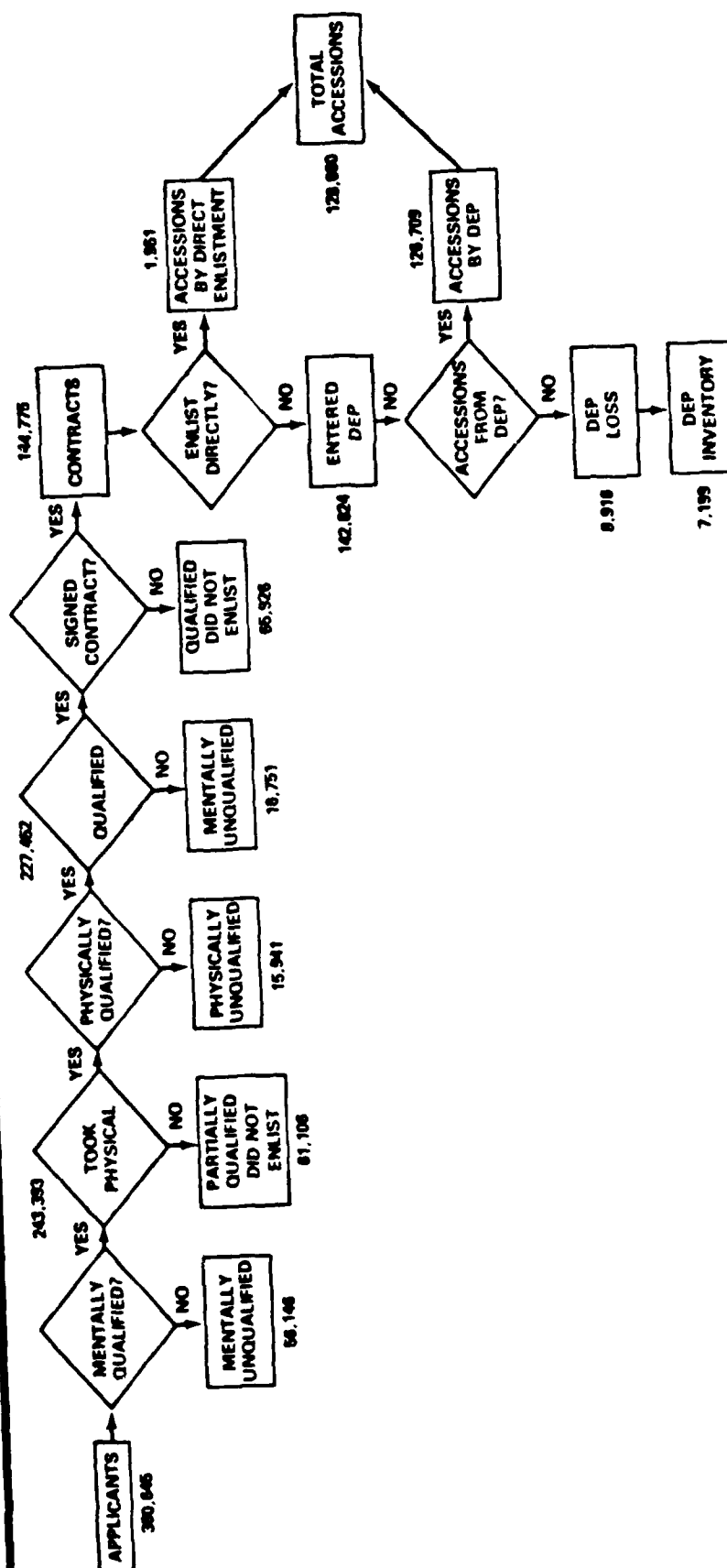


Figure 4

Table 7
Comparison of Contracting Probabilities
FY81 and FY82

<u>High School Graduates</u>		<u>FY81</u>	<u>FY82</u>	<u>Change</u>
Mental Category I & II	White	51.7	56.7	+ 5.0
	Non-White	54.0	62.5	+ 8.5
IIIA	White	58.0	61.7	+ 3.7
	Non-White	61.0	69.0	+ 8.0
IIIB	White	57.9	59.3	+ 1.4
	Non-White	65.9	72.1	+ 6.2
IV	White	56.2	46.1	-10.2
	Non-White	59.8	50.2	- 9.6
<u>Non-High School Graduates</u>				
Mental Category I & II	White	57.3	59.8	+ 2.5
	Non-White	59.0	65.2	+ 6.2
IIIA	White	62.5	67.1	+ 4.6
	Non-White	65.4	74.8	+ 9.4
IIIB	White	69.8	22.4	-47.4
	Non-White	74.0	37.8	-36.2

High quality applicant losses amounted to 41 percent of the applicants. Since another 3 percent are likely to be lost from the DEP, nearly half of these applicants would not access. The greatest losses occurred at the point of taking the physical (23 percent) and signing a contract (12 percent), with less than 7 percent failing to pass the physical. The QNE losses found (12 percent) were greater than found in FY77 (4 percent). This could be due to differences in category definitions, or the fact that higher quality people were less likely to negotiate a desirable contract in FY81 compared to FY77.

The limited time between initial application and contract indicates that it may not be possible to use certain methodologies for making MOS recommendation. Many individuals have both their test scores reported and contract at the same time. A batch procedure that assigned specific training slots to individuals would not be feasible in such a situation. Either administrative procedures would need to be modified or a sequential assignment algorithm should be used for recommending MOS. (See Ward, 1977, for an example of such an algorithm).

The differences in contract probabilities by AFQT category and education were substantial. The more desirable a candidate, the less likely he was to sign a contract. These rates indicate that there may be substantial gains in contracting through improved marketing and contract negotiation. For example, by allocating MOS training based upon an optimal person-job match, rather than first-come first-served, it should be possible to increase the number of high quality contracts without lowering the contract rate for others. This could increase the number of I-III A male HSDGs the Army would be able to recruit. Given \$1,889 in average direct costs for recruiting a non-prior service HSDG (US Army Audit Agency, 1982), a reduction of only 529 QNE losses would save \$1 million. This could be accomplished by less than a 1 percent increase in the contract rate.

Non-White applicants had higher contracting probabilities than whites of similar characteristics. Contracting probabilities increased between FY81 and FY82, and increased more for non-whites than comparable whites. This may indicate that non-whites who apply to the Army are more sensitive to economic conditions than whites. Given limited non-military opportunities, they could be more likely to sign a contract. This is different from the effects of unemployment and race found in many aggregate econometric analyses. For example, Dale and Gilroy found that aggregate white male enlistments were more sensitive to unemployment rates than blacks. However, if one examines the behavior of individuals who actually apply to the Army and controls for AFQT category and education, then blacks appear to be more sensitive to economic conditions. A survey of people entering the Army found that substantially more blacks than whites stated economic reasons for enlisting, such as being unemployed and being able to earn more money in the Army. (Elig, 1983).

The results from the modeling of enlistment processing provide useful information on what happens to different kinds of applicants at various points. No doubt the analysis of FY83 applicant processing will provide additional insights. However, other research should be conducted on forecasting applicants and modeling the enlistment decision.

The Army's selection and MOS allocation system presently operates on a first-come first served basis. As a result, there are frequent imbalances between personnel supply and applicants. Forecasts of both the numbers and

kinds of people likely to enlist in the near term could improve the allocation process.

The principal findings of this analysis discuss how different categories of people have made decisions during the enlistment process. Many highly qualified individuals do not enlist. A better understanding of this process is necessary to capitalize on the potential of such systems as JOIN and EPAS. The Army needs to know what kinds of information it can provide individuals to increase their likelihood of enlisting, and how to manage contract negotiations to achieve a better match between the preferences of applicants and the needs of the Army.

REFERENCES

- Allen J., and Schmitz, E. J. Long Range Enlistment Supply Forecasts. Personnel Utilization Technical Area Working Paper. August 1983.
- Berryman, S. E., Bell, R. M. & Lisowski, W. The Military Enlistment Process. Rand Corporation. (R-2986-MRAL). May, 1983.
- Dale, C. and Gilroy, C. "The Effects of the Business Cycle on the Size and Composition of the U. S. Army. Atlantic Economic Journal. Vol XI, No. 1 March 1983
- Daula, T. V. & T. W. Fagan. A Microdata Model of Enlistment in the Armed Forces. U. S. Military Academy. June 1982.
- Eaton, N. K., M. Welton, and H. Wing, Validity of the Military Applicant Profile for Predicting Early Attrition in Different Educational, Age, and Racial Groups. ARI Technical Report 567. December 1982.
- Elig, T. W., R. Johnson, P. A. Gade, and A. Hertzbach The 1982 DA Survey of Personnel Entering the Army: Tabular Description of 1982 Active Army Accessions. PUTA Working Paper. May 1983.
- Hatch, R. S. Development of Optimal Allocation Algorithms for Personnel Assignment. In Smith, A. R. (Ed.) Models of Manpower Systems. 1971.
- Manganaris, A. and E. J. Schmitz. Projecting Attrition by MOS. ARI Draft Report. June 1984.
- Schmitz, E. J. and P. B. McWhite. Development of the Army's Enlisted Personnel Allocation System. Draft ARI Technical Report. May 1984.
- Tarbutton, T. R., R. Johnson, and M. Welton. JOIN Independent Test and Evaluation-Final Report. April 1983.
- U. S. Army Audit Agency, Cost of Recruiting. Report No. MW 82-701. January, 1982.
- Ward, J. H. Creating Mathematical Models of Judgement Processes: From Policy Capturing to Policy Specifying. AFHRL Technical Report 77-47. August 1977.

Appendix A

Recruiting Trends

		<u>FY 74</u>	<u>FY 75</u>	<u>FY 76</u>	<u>FY 77</u>	<u>FY 78</u>
Total Objective		198,000	204,600	192,600	182,200	137,000
Total Accessions		199,196	208,915	193,024	180,718	134,428
% of Objective		100.6	102.1	100.2	99.2	98.1
NPS Male Objective		170,600	167,600	164,100	153,000	109,300
NPS Male Accessions		166,798	165,610	164,291	153,434	106,512
% of Objective		97.8	98.8	100.1	100.3	97.4
NPS Female Objective		14,100	16,300	15,900	14,900	17,600
NPS Female Accessions		15,446	19,070	15,884	14,964	17,517
% of Objective		109.5	117.0	99.9	100.4	99.5
PS Personnel Objective		13,300	20,700	12,600	14,300	10,100
PS Personnel Accessions		16,952	24,235	12,849	12,320	10,399
% of Objective		127.5	117.1	102.0	86.2	103.0
Total Education (NPS)						
Diploma (NPS)	(#)	91,210	106,784	105,543	99,681	91,386
Diploma (NPS)	(%)	50.1	57.8	58.6	59.2	73.7
GED (NPS)	(%)	6.0	8.4	5.4	3.9	3.5
Total Education (NPSM)						
Diploma (Male Only)	(#)	77,839	89,883	91,310	86,228	74,566
Diploma (Male Only)	(%)	46.7	54.3	55.6	56.2	70.0
GED (Male Only)	(%)	5.3	8.0	4.9	3.3	3.5
Test Score Category (NPS)						
I	(#)	6,542	8,391	9,541	3,901	3,127
	(%)	3.6	4.6	5.3	2.3	2.5
II	(#)	50,042	55,968	49,727	29,929	23,826
	(%)	27.5	30.3	27.6	17.8	19.2
IIIA	(#)	39,029	41,983	39,546	23,769	20,133
	(%)	21.4	22.7	21.9	14.1	16.2
I-IIIA	(#)	95,613	106,342	98,814	57,599	47,086
	(%)	52.5	57.6	54.8	34.2	37.9
IIIB	(#)	54,167	59,809	67,750	36,972	28,186
	(%)	29.7	32.4	37.6	22.0	22.7
IV	(#)	32,464	18,529	13,611	73,827	48,757
	(%)	17.8	10.0	7.6	43.8	39.3
Blacks (NPS)	(#)	49,654	42,341	43,881	49,433	42,525
	(%)	27.2	23.0	24.4	29.4	34.3
Two-Year Term (NPS)	(#)	40,353	30,872	998	0	0
	(%)	22.1	16.7	0.6	0.0	0.0
Three-Year Term (NPS)	(#)	126,246	127,060	132,680	127,114	87,362
	(%)	69.3	61.8	73.6	75.5	70.4
Four(+)-Year Term (NPS)	(#)	15,645	26,748	46,497	41,284	36,667
	(%)	8.6	14.5	25.8	24.5	29.6

FY 77-FY 80 TSC DATA RENORMED

SP6 CASTLEDINE/53037
DAPE-MPA-EA

		<u>FY 79</u>	<u>FY 80</u>	<u>FY 81</u>	<u>FY 82</u>	<u>FY 83</u> ¹
Total Objective		159,200	172,800	136,800	125,100	144,500
Total Accessions		142,156	173,228	137,916	130,198	145,377
% of Objective		89.3	100.2	100.8	104.1	100.6
NPS Male Objective		130,400	134,400	98,500	100,500	116,000
NPS Male Accessions		112,088	135,969	99,613	105,158	116,215
% of Objective		86.0	101.2	101.1	104.6	100.2
NPS Female Objective		18,800	23,400	18,300	15,100	16,400
NPS Female Accessions		17,196	22,210	18,302	15,195	16,516
% of Objective		91.5	94.9	100.0	100.6	100.7
PS Personnel Objective		10,000	15,000	20,000	9,500	12,100
PS Personnel Accessions		12,872	15,049	20,001	9,845	12,606
% of Objective		128.7	100.3	100.0	103.6	104.2
Total Education (NPS)						
Diploma (NPS)	(#)	82,843	85,825	94,730	103,571	116,246
Diploma (NPS)	(%)	64.1	54.3	80.3	86.0	87.6
GED (NPS)	(%)	5.0	3.7	3.1	2.8	4.3
Total Education (NPSM)						
Diploma (Male Only)	(#)	65,647	66,517	77,529	88,376	99,726
Diploma (Male Only)	(%)	58.6	48.9	77.8	84.0	85.8
GED (Male Only)	(%)	5.7	3.8	3.2	3.2	5.0
Test Score Category (NPS)						
I	(#)	2,469	2,391	2,638	3,536	4,638
	(%)	1.9	1.5	2.2	2.9	3.5
II	(#)	19,811	20,482	25,187	34,929	43,862
	(%)	15.3	12.9	21.4	29.0	33.0
IIIA	(#)	17,367	18,346	19,337	25,346	33,030
	(%)	13.4	11.6	16.4	21.1	24.9
I-IIIA	(#)	39,647	41,218	47,162	63,811	81,530
	(%)	30.6	26.0	40.0	53.0	61.4
IIIB	(#)	30,185	34,929	34,335	33,421	35,236
	(%)	23.4	22.1	29.1	27.8	26.6
IV	(#)	59,452	82,031	36,418	23,121	15,965
	(%)	46.0	51.9	30.9	19.2	12.0
Blacks (NPS)	(#)	47,586	47,232	32,236	29,572	29,158
	(%)	36.8	29.8	27.4	24.6	22.0
Two-Year Term (NPS)	(#)	986	1,552	2,150	6,616	4,281 ²
	(%)	0.8	1.0	1.8	5.5	6.7
Three-Year Term (NPS)	(#)	85,519	108,024	73,901	68,741	36,787
	(%)	66.1	68.3	62.7	57.1	57.5
Four(+)-Year Term (NPS)	(#)	42,779	42,779	41,864	44,996	22,949
	(%)	33.1	30.7	35.5	37.4	35.8

FY 77-FY 80 TSC DATA RENORMED

SP6 CASTLEDINE/53037
DAPE-MPA-EA

¹FY TO DATE THRU SEP 1983.

²DATA AS OF 31 MARCH 1983.

Appendix B

FY82 Processing Results

Table B-1

Percent of FY82 Male Non-Prior Service
Applicants Who Take Physical

<u>Mental Category</u>	<u>Race</u>	<u>High School Graduates</u>	<u>Non-High School Graduates</u>
I & II	White	80.6	81.7
	Non-White	85.1	87.3
IIIA	White	82.0	89.0
	Non-White	89.1	93.4
IIIB	White	80.8	56.7
	Non-White	91.9	70.1
IV	White	74.9	-
	Non-White	79.9	-

Table B-2

Percent of FY82 Male Non-Prior Service
Applicants Who Pass Physical

<u>Mental Category</u>	<u>Race</u>	<u>High School Graduates</u>	<u>Non-High School Graduates</u>
I & II	White	93.8	94.6
	Non-White	93.3	94.3
IIIA	White	93.7	94.2
	Non-White	93.8	96.1
IIIB	White	93.1	92.2
	Non-White	93.8	92.6
IV	White	92.9	-
	Non-White	94.4	-

Table B-3

Percent of FY82 Fully Qualified Non-Prior Service
Male Applicants Who Sign Contract

<u>Mental Category</u>	<u>Race</u>	<u>High School Graduates</u>	<u>Non-High School Graduates</u>
I & II	White	75.0	77.4
	Non-White	78.7	79.2
IIIA	White	80.2	80.9
	Non-White	82.6	83.3
IIIB	White	78.9	43.0
	Non-White	83.6	58.2
IV	White	66.3	-
	Non-White	66.6	-

Table B-4

Percent of FY82 Non-Prior Service Male
Accessions Who Sign Contract

<u>Mental Category</u>	<u>Race</u>	<u>High School Graduates</u>	<u>Non-High School Graduates</u>
I & II	White	56.7	59.8
	Non-White	62.5	65.2
IIIA	White	61.7	67.1
	Non-White	69.0	74.8
IIIB	White	59.3	22.4
	Non-White	72.1	37.8
IV	White	46.1	-
	Non-White	50.2	-

Table B-5

Percent of FY82 Delayed Entry Program Loss
For Male Non-Prior Service Contract

<u>Mental Category</u>	<u>Race</u>	<u>High School Graduates</u>	<u>Non-High School Graduates</u>
I & II	White	3.4	4.7
	Non-White	3.1	3.7
IIIA	White	3.6	3.8
	Non-White	2.9	4.7
IIIB	White	4.7	15.2
	Non-White	3.9	7.3
IV	White	8.0	-
	Non-White	5.7	-